



Severe Acute Respiratory Syndrome (SARS) : New Plague in the 21st Century

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SARS is the first severe and readily transmissible disease emerged in the 21st century. SARS has a unique capacity of spreading quickly in hospitals and clinics affecting thousands of health care workers in a very short time. The booming of international air travel in recent decades has also empowered the infection to be quickly spread across the continents and becoming an international threat. One infected tourist from China checked into a hotel in Hong Kong and spread the infection to three countries. Up to 3 July 2003, 32 countries were involved and 8439 patients infected around the world. Because of the seriousness on the infection and the high infectivity, "WHO regards every country with an international airport, or bordering an area having recent local transmission, as at potential risk of an outbreak." In the combat of this serious infection, the international scientific community has come to put their efforts together. On 15 March 2003, the day WHO issued emergency travel advise in response to SARS, it set up a network of scientists from 11 laboratories around the world to expedite the identification of the causative agent of SARS. They were asked to share among the members scientific data and clinical specimens. The collaboration was continued through daily teleconferences and use of the WHO website to post electron microscopy pictures of candidate viruses, protocols for testing, phylogenetic trees, PCR primer sequences and results of various diagnostic tests. These arrangements allow simultaneous analyses of samples from the same patients in several laboratories with different approaches. With these efforts, in just about one month, a new specie of coronavirus now called SARS-CoV was identified. There is a high possibility that the epidemic will come back during the winter. This prediction is based on 3 reasons. First, despite much efforts contributed by virologists and molecular biologists, we are still not sure the source of the infection. Early reports suggested that SARS-CoV resembled the bovine coronavirus or mouse hepatitis virus. Yet, after the sequence of the whole viral genome was completed, it becomes clear that the SARS-CoV is a distinctly new pathogenic strain that does not arise from a simple recombination of known existing strains. But, we are still not sure where it comes from. Second, serological studies have reviewed that asymptomatic or subclinical infection of SARS-CoV is uncommon. We examined 674 health care workers at the Prince of Wales Hospital, where the first hospital outbreak occurred in Hong Kong, among them 43% had direct contact with SARS patients. None of them had IgG antibody to SARS-CoV. Similar studies conducted in China confirmed that asymptomatic carriers are few. This implies that immunity to SARS-CoV in the community will develop slowly. Third, although RNA viruses are known to mutate more readily than DNA viruses, genomic studies of SARS-CoV including strains isolated from Singapore, Hong Kong, Guangdong and Beijing showed a remarkable genetic conservation of the virus since the outbreak was first started in November 2002. Unlike most other infectious agents

transmitted by direct person-to-person contact, the SARS-CoV is unlikely to mutate to a benign infection and attenuated symptoms. Without herd immunity and attenuation of the virus, when the next epidemic comes, one would still expect to have large-scale outbreak with severe symptoms. What can we do to prepare for the come back? It would be a while before vaccine can be developed, if it could ever be developed. We should continue to search the source of the virus and study the mode of transmitting the disease. We should maintain our high vigilance of the infection. When we see suspected cases, we should implement isolation, quarantine and cohorting measures. Developing a rapid diagnostic test, probably PCR-based, which can differentiate SARS from other atypical pneumonia at an earliest possible stage of the disease would be instrumental in applying these measures successfully.